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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/547,844

09/02/2005

Satoshi Sugahara

125209

2196

25944

7590

10/22/2007

OLIFF & BERRIDGE, PLC

P.O. BOX 320850

ALEXANDRIA, VA 22320-4850

EXAMINER

SANDVIK, BENJAMIN P

ART UNIT

PAPER NUMBER

2826

MAIL DATE

DELIVERY MODE

10/22/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/547,844

Applicant(s)

SUGAHARA ET AL.

Examiner

Ben P. Sandvik

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 August 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 5-17, 40-60, 62-65, 67-81 and 83-86 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-3, 5-17, 40-60, 62-65, 67-71, 75, 81, 83-86 and 7680 is/are allowed.
- 6) ☒ Claim(s) 72-74 and 77-79 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments, filed 8/16/2007, with respect to claim 75 have been fully considered and are persuasive. The rejection of claim 75 has been withdrawn.

Applicant's arguments with respect to claim 72 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 72 and 77-79 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu et al (U.S. Patent #6753562).

With respect to **claim 72**, Hsu teaches a transistor comprising a source and drain that are of a first conduction type (Fig. 3a, 102 and 103), and are formed with ferromagnetic semiconductors; a semiconductor layer that is provided associated with the source and the drain (Fig. 3a, 101), and has a channel of first conduction type formed therein (Fig. 3a, 100; and Col 6 Ln 52-55, all semiconductors may be the same conduction type); and a gate electrode that

is formed as opposed to the semiconductor layer (Fig. 3a, 104); wherein the ferromagnetic semiconductors in the source and drain are directly contacted with the semiconductor layer.

With respect to **claim 77**, Hsu teaches that when the relative magnetization of the ferromagnetic drain with respect to the ferromagnetic source is antiparallel magnetization, the drain current is lower than the drain current in a case of parallel magnetization (Col 9 Ln 3-8).

With respect to **claim 78**, Hsu teaches that the trans-conductance can be controlled in accordance with the relative magnetization direction of the ferromagnetic drain with respect to the ferromagnetic source (Col 2 Ln 61-65).

With respect to **claim 79**, Hsu teaches using the transistor, information being stored in accordance with the relative magnetization direction of the ferromagnetic drain with respect to the ferromagnetic source, the information stored in the transistor being detected based on the transconductance of the transistor depending on the relative magnetization direction of the ferromagnetic drain with respect to the ferromagnetic source (Col 2 Ln 61-65)

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 73 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu, in view of Ohno et al (U.S. PG Pub #2001/0031547).

With respect to **claim 73**, Hsu does not teach that the semiconductor layer is formed with an undoped semiconductor or an intrinsic semiconductor. Ohno teaches that the semiconductor layer is formed with an undoped semiconductor or an intrinsic semiconductor (Paragraph 28, GaSb). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use undoped semiconductors in the transistors of Hsu as taught by Ohno in order to achieve the predictable result of forming a MOSFET.

Claim 74 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu, in view of Johnson.

With respect to **claim 74**, Hsu does not teach that the channel length is equal to or shorter than the mean free path associated with carrier energy relaxation. Johnson teaches that the channel length is equal to or shorter than the mean free path associated with carrier energy relaxation (Col 10 Ln 60-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to arrange the channel length as taught by Johnson in order to control the resistance between the source and drain.

***Allowable Subject Matter***

Claims 1-3, 5-17, 40-60, 62-65, 67-71, 75-76, 80-81, and 83-86 are allowed.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben P. Sandvik whose telephone number is (571) 272-8446. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

bps

  
**EVAN PERT**  
**PRIMARY EXAMINER**